

WHAT IS CLAIMED IS:

1. In a process for the production of ethylbenzene from a dilute ethylene stream wherein an ethylene-containing stream derived from the cracking of a hydrocarbon feed is directed to an ethylene fractionator for separation of ethylene and ethane, an improvement comprising:

a) providing the dilute ethylene stream by

i. liquefying and separating out a portion of the ethylene-containing stream prior to directing the remainder of the ethylene-containing stream to the ethylene fractionator, and/or by

ii. drawing off a side stream from the ethylene fractionator; and,

b) directing said dilute ethylene stream as a feed to an alkylator for alkylation with benzene to produce ethylbenzene-containing effluent.

2. The process of claim 1 wherein said cracking of a hydrocarbon feed is a thermal cracking process.

3. The process of claim 2 wherein the hydrocarbon feed is selected from the group consisting of ethane, propane, butane, naphtha, gas oil, hydrocracked vacuum gas oil and combinations thereof.

4. The process of claim 2 wherein the hydrocarbon feed is ethane or naphtha.

5. The process of claim 1 wherein the dilute ethylene stream has an ethylene content of from about 60 mol% to about 85 mol%.

6. The process of claim 1 wherein the dilute ethylene stream is provided by first separating out the portion of the ethylene-containing stream and then substantially totally condensing said separated portion to produce a liquefied dilute ethylene stream for use as the alkylator feed.

7. The process of claim 6 wherein the dilute ethylene stream has an ethylene content of from about 80 mol% to about 83 mol%.

8. The process of claim 1 wherein the dilute ethylene stream is provided by cooling the ethylene-containing stream sufficiently to partially condense the ethylene stream to provide a liquefied dilute ethylene stream for use as the alkylator feed and an uncondensed remaining portion of the ethylene-containing stream which is then directed to the ethylene fractionator as a vapor.

9. The process of claim 8 wherein the dilute ethylene stream has an ethylene content of from about 72 mol% to about 78 mol%.

5 10. The process of claim 1 wherein the dilute ethylene stream is provided as a liquid or vapor side draw from a stripping section of the ethylene fractionator.

10 11. The process of claim 10 wherein the dilute ethylene stream has an ethylene content of from about 60 mol% to about 65 mol%.

15 12. The process of claim 1 wherein the dilute ethylene stream is provided as a liquid or vapor side draw from a rectification section of the ethylene fractionator.

13. The process of claim 12 wherein the dilute ethylene stream has an ethylene content of from about 82 mol% to about 85 mol%.

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14. The process of claim 1 wherein the ethane separated by the ethylene fractionator is recycled to a cracking zone.

15. The process of claim 1 further comprising
25 fractionating the ethylbenzene-containing effluent from the

alkylator in a first fractionator to provide an overhead stream containing unconverted benzene and a bottom stream containing ethylbenzene.

5 16. The process of claim 15 comprising recycling at least a portion of the overhead stream from the first fractionator to the alkylator.

10 17. The process of claim 16 further comprising fractionating the bottom stream of the first fractionator in a second fractionator to provide an ethylbenzene overhead and a bottom stream containing polyethylbenzene.

15 18. The process of claim 17 wherein the bottom stream of the second alkylator is fractionated in a third fractionator to provide a polyethylbenzene-containing overhead stream, and recycling the polyethylbenzene-containing overhead stream to a transalkylator for transalkylation with a portion of the unconverted benzene
20 recycled from the first fractionator.